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EXAMINER	
THOMPSON, JAMES A	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/512,378	AU ET AL.	
	Examiner	Art Unit	
	James A Thompson	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 17 February 2004.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-9 and 11-22 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-9 and 11-22 is/are rejected.

7)☒ Claim(s) 9 is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 9 is objected to because of the following informalities: The equation $f(v) = a\left(1 - v/b\right)^k$ is written incorrectly as f(v)=a(1-v/b)k, thus showing k as a coefficient instead of an exponent. Furthermore, the equation as written in claim 9 is different than the equation as written in the original claim 9, but claim 9 in the amendments is labeled as "original." Appropriate correction is required.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. Claims 1-9 and 11-22 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claims contain subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claims 1 and 22 specifically refer to "obtaining for each individual pixel a continuous value as a weighted sum." Claims 2-4, 6 and 13-17 specifically refer to a "significance coefficient."

Applicant discloses, on page 9, lines 12-13 of the specification, an equation for the significance coefficient that produces the results of figures 1-3. However, Applicant

fails to disclose the sequence of steps necessary for one of ordinary skill in the art to achieve the results shown in figures 1-3, and stated in tables 2-4 on pages 11-12, without undue experimentation. Although reference is made to the algorithm (page 9, lines 12-13 and page 10, lines 22-24 of specification), the results shown are the results of an undisclosed sequence of steps comprising a specific algorithm. The specification does not detail the specific steps of Applicant's invention. In the specification, Applicant describes that the baseline value $w^m(i,j)$, which is essential to determining the significance coefficients (page 7, lines 16-20 of specification), "may be y^m itself, but more preferably it is a function of $y^n(i,j)$ for any n less than or equal to m, in which the high frequency components are reduced, e.g. y^m subjected to a low pass filter, such as an average over the pixels neighboring (i,j)" (page 7, lines 12-14 of specification). Applicant does not set forth the specific steps of the algorithm for calculating the baseline value $w^m(i,j)$, but instead gives several vague possibilities. According to Applicant, $w^m(i,j)$ may be $y^m(i,j)$ or $y^n(i,j)$, $w^m(i,j)$ may be subject to an unspecified low pass filter or to an averaging over the pixels neighboring (i,j). Furthermore, the specific method of defining a neighborhood for pixel (i,j) is not adequately described. One of ordinary skill in the art would assume that a "neighborhood of pixels" means all pixels that are a distance of about 1 to 3 pixels from the center pixel. Applicant does not describe whether the neighborhood of pixels is defined in this way or in some other way, or disclose specific steps with which one of ordinary skill can determine a neighborhood of pixels without undue experimentation. Applicant further describes four possible functions to use in determining the significance coefficient (page 13, lines 3-10 of

specification), but does not disclose specifically which equation is used in obtaining the results listed in the tables that follow, specifically tables 5-7 on pages 13-16.

In conclusion, Applicant has failed to provide an enabling disclosure that would allow someone of ordinary skill in the art to make and/or use the invention to achieve the results described and claimed by Applicant without undue experimentation.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless -
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-5, 11-17 and 18-22 are rejected under 35 U.S.C. 102(b) as being anticipated by Wong (US Patent 5,506,699).

Claims 1 and 22 are discussed together. The apparatus of claim 22 performs the method of claim 1.

Claims 4 and 15 disclose the same limitations. Claims 4 and 15 are therefore discussed together.

Regarding claims 1 and 22: Wong discloses an image enhancement apparatus (figure 3 of Wong) for converting a first image into an enhanced image (column 5, lines 6-9 of Wong), comprising a processing device (figure 3(22,24) of Wong). Said processing device is shown in further detail in figure 2 of Wong (column 4, lines 37-40 of Wong).

Said processing device has an image receiver for receiving said first image (column 5, lines 10-12 of Wong). As can clearly be seen in figure 3 of Wong, binary image data is input into said processing device. An image receiver is therefore inherent as part of said processing device.

Said processing device has an image processor (figure 3(22,24) of Wong). Said image processor defines, for each pixel, a respective neighborhood containing that pixel and other pixels (column 5, lines 23-26 of Wong).

Said image processor, in a first iteration, obtains for each individual pixel a continuous value by summing the products of weighting values ($\nu_{m,n}$) and the binary values of the pixels in the neighborhood of the individual pixel (column 5, lines 36-44 of Wong), the weighting values being derived from the values of the first image (column 5, lines 27-29 of Wong). The weighting values ($\nu_{m,n}$) for each pixel are determined by calculating the local variation of the pixels in the respective neighborhood of each pixel (column 5, lines 51-55 of Wong). The pixel values for the first iteration are inherently binary values since binary image data is input (figure 3("binary image") of Wong).

Said image processor, in further iterations, obtains for each individual pixel a continuous value by summing the products of weighting values ($\nu_{m,n}$) and the continuous values of the pixels in the neighborhood of the individual pixel (column 5, lines 36-44 of Wong) obtained at the previous iteration (column 5, lines 44-47 of Wong), the weighting values being derived from the continuous values (column 5, lines 27-29 of Wong) obtained in at least one previous said iteration (column 5, lines 53-55 of Wong).

The updated value for $v_{m,n}$ is calculated based on the previous value of the pixels in the neighborhood ($x_{i,j}^{old}$ for (i,j) in $R_{m,n}$) (column 5, lines 44-47 and lines 53-55 of Wong).

Further regarding claim 18: Wong discloses a computer program product which is readable by a computing device to cause a computing device to perform a method (column 6, lines 56-60 of Wong). Since Wong is converting digital data for a color monitor (column 6, lines 53-60 of Wong), then it is inherent that some form of computer program product which is readable by some form of computing device to cause said computing device to perform the method. Since Wong discloses the method of claim 1, as discussed in the arguments regarding claim 1, then said method is the method according to claim 1.

Regarding claim 2: Wong discloses a method for converting a halftone image having a halftone value for each of a plurality of pixels (column 4, lines 50-53 of Wong), into a reconstructed image which for each of said pixels takes on one of more than two possible values (column 5, lines 4-6 of Wong). Since the reconstructed image is a gray scale image (column 5, lines 4-6 of Wong), then each pixel of said reconstructed image inherently takes on one of more than two possible values.

For successive individual pixels, said method comprises defining a set of neighborhood pixels of the individual pixel, the set of neighborhood pixels including the individual pixel and additionally a plurality of pixels proximate said individual pixel (column 5, lines 24-26 of Wong).

Said method further comprises deriving for each pixel of the neighborhood, a significance coefficient ($\left[\frac{1}{\|R_{m,n}\|}\left|x_{i,j}^{old}-\mu_{m,n}\right|^{r}\right]^{1/r}$) (column 5, lines 51-55 of Wong). Said significance coefficient is an element of the summation which is performed in calculating the weighting coefficient ($\nu_{m,n}$) and is a measure of the variation between pixel (i,j) and pixel (m,n) (column 5, lines 51-55 of Wong).

Said method further comprises deriving the reconstructed value of the individual pixel (column 5, lines 36-43 of Wong) as a sum over the pixels of the neighborhood (column 5, lines 53-60 of Wong) of a product of the halftone image value at that neighborhood pixel with the significance coefficient of that neighborhood pixel (column 5, lines 38-43 of Wong).

Further regarding claim 19: Wong discloses a computer program product which is readable by a computing device to cause a computing device to perform a method (column 6, lines 56-60 of Wong). Since Wong is converting digital data for a color monitor (column 6, lines 53-60 of Wong), then it is inherent that some form of computer program product which is readable by some form of computing device to cause said computing device to perform the method. Since Wong discloses the method of claim 2, as discussed in the arguments regarding claim 2, then said method is the method according to claim 2.

Regarding claim 3: Wong discloses that said halftone image is derived from an original image having a continuous value for each pixel (column 4, lines 49-53 of

Wong), and, for each individual pixel, said significance coefficient ($\left[\frac{1}{\|R_{m,n}\|}\left|x_{i,j}^{old}-\mu_{m,n}\right|^{r}\right]^{1/r}$) of each neighborhood pixel is an indication of the likelihood that the value of that neighborhood pixel in the original image is correlated with the value of the individual pixel in the original image (column 5, lines 51-52 and lines 64-67 of Wong). By determining the local variation centered about the sample mean (column 5, lines 51-55 of Wong), the correlation between the neighborhood pixel (i,j) and the individual pixel (m,n) is determined. The lower the variation, the higher the level of correlation.

Regarding claims 4 and 15: Wong discloses that, for each individual pixel, said step of deriving a significance coefficient ($\left[\frac{1}{\|R_{m,n}\|}\left|x_{i,j}^{old}-\mu_{m,n}\right|^{r}\right]^{1/r}$) for each neighborhood pixel includes deriving a baseline value for the individual pixel ($\mu_{m,n}$) (column 5, lines 56-60 and column 6, lines 4-6 of Wong), and deriving said significance coefficient as a function of the halftone value for the image at that neighborhood pixel ($x_{i,j}^{old}$) and of the baseline value for the individual pixel (column 5, lines 51-55 of Wong).

Regarding claim 5: Wong discloses that the baseline value for the individual pixel is derived by low pass filtering of the halftone image (figure 2(18) and column 5, lines 7-9 of Wong). The image is low-pass filtered (column 5, lines 16-22), thus modifying the pixel values used in the computation of the baseline value ($\mu_{m,n}$) (column 5, lines 24-27 of Wong).

Regarding claim 11: Wong discloses forming an enhanced reconstructed image as a linear combination of said reconstructed image (figure 3(24) of Wong) and a

continuous image derived from said halftone image by a second image reconstruction method (figure 3(26) of Wong) (column 6, lines 35-37 of Wong).

Regarding claim 12: Wong discloses that said second image reconstruction method is a low pass filter (figure 3(26) and column 6, lines 35-37 of Wong).

Regarding claim 13: Wong discloses a method for converting a halftone image having a binary value for each of a plurality of pixels, into a reconstructed image which for each of said pixels takes on one of more than two possible values (column 5, lines 4-7 of Wong).

For successive individual pixels, said method comprises defining a set of neighborhood pixels of the individual pixel and additionally a plurality of pixels proximate said individual pixel (column 5, lines 24-27 of Wong).

Said method further comprises deriving for each pixel of said first neighborhood, a respective significance coefficient ($\left[\frac{1}{\|R_{m,n}\|}\left|x_{i,j}^{old} - \mu_{m,n}\right|^{r}\right]^{1/r}$) (column 5, lines 51-55 of Wong). Said significance coefficient is an element of the summation which is performed in calculating the weighting coefficient ($v_{m,n}$) and is a measure of the variation between pixel (i,j) and pixel (m,n) (column 5, lines 51-55 of Wong).

Said method further comprises deriving a first reconstructed value of the individual pixel ($x_{m,n}^{new}$) (column 5, lines 36-44 of Wong) as a sum over the neighborhood pixels of a product of the halftone image value at that neighborhood pixel with the respective significance coefficient of that neighborhood pixel (column 5, lines 51-60 of Wong).

Said method further comprises, for successive individual ones of said pixel, M further steps, m=1,...,M (M>=1) (figure 3("k times") and column 5, lines 10-12 of Wong), of rederiving said significance coefficient for each neighborhood pixel (column 5, lines 51-55 of Wong); and deriving an (m+1)-th reconstructed value of the individual pixel ($x_{m,n}^{new}$) (column 5, lines 36-44 of Wong) as a sum over the neighborhood pixels of the product of the m-th reconstructed value at that neighborhood pixel ($x_{m,n}^{old}$) with the significance coefficient at that neighborhood pixel (column 5, lines 51-60 of Wong). The inverse halftoning stages (figure 2 of Wong) are repeated a plurality of times (column 5, lines 10-12 of Wong), thus repeating the same procedure in the first iteration.

Further regarding claim 20: Wong discloses a computer program product which is readable by a computing device to cause a computing device to perform a method (column 6, lines 56-60 of Wong). Since Wong is converting digital data for a color monitor (column 6, lines 53-60 of Wong), then it is inherent that some form of computer program product which is readable by some form of computing device to cause said computing device to perform the method. Since Wong discloses the method of claim 13, as discussed in the arguments regarding claim 13, then said method is the method according to claim 13.

Regarding claim 14: Wong discloses a method for converting a halftone image having a binary value for each of a plurality of pixels, into a reconstructed image which for each of said pixels takes on one of more than two possible values (column 5, lines 4-7 of Wong).

Said method comprises preprocessing the halftone image by a filtering algorithm (figure 2(18) of Wong) to derive a preprocessed image having a preprocessed image value for each of said pixels (column 5, lines 6-8 of Wong). The first stage by which the initial binary data is processed in a low-pass filter (figure 2(18) and column 5, lines 7-8 of Wong).

For successive individual pixels, said method comprises defining a set of neighborhood pixels of the individual pixel, the set of neighborhood pixels including the individual pixel and additionally a plurality of pixels proximate said individual pixel (column 5, lines 24-27 of Wong).

For successive individual pixels, said method further comprises deriving for each pixel of the neighborhood, a respective significance coefficient ($\left[\frac{1}{\|R_{m,n}\|}\left|x_{i,j}^{old}-\mu_{m,n}\right|^{r}\right]^{1/r}$) (column 5, lines 51-55 of Wong). Said significance coefficient is an element of the summation which is performed in calculating the weighting coefficient ($\nu_{m,n}$) and is a measure of the variation between pixel (i,j) and pixel (m,n) (column 5, lines 51-55 of Wong).

For successive individual pixels, said method further comprises deriving the reconstructed value of the individual pixel ($x_{m,n}^{new}$) (column 5, lines 36-44 of Wong) as a sum over the pixels of the neighborhood of a product of the preprocessed image value at that neighborhood pixel with the significance coefficient of that neighborhood pixel (column 5, lines 51-60 of Wong).

Further regarding claim 21: Wong discloses a computer program product which is readable by a computing device to cause a computing device to perform a method (column 6, lines 56-60 of Wong). Since Wong is converting digital data for a color monitor (column 6, lines 53-60 of Wong), then it is inherent that some form of computer program product which is readable by some form of computing device to cause said computing device to perform the method. Since Wong discloses the method of claim 14, as discussed in the arguments regarding claim 14, then said method is the method according to claim 14.

Regarding claim 16: Wong discloses a method for enhancing a first image having a first value for each of a plurality of pixels, into an enhanced image (column 5, lines 4-7 of Wong).

For successive individual pixels, said method comprises defining a set of neighborhood pixels of the individual pixel, the set of neighborhood pixels including the individual pixel and additionally a plurality of pixels proximate said individual pixel (column 5, lines 24-27 of Wong).

For successive individual pixels, said method further comprises deriving for each pixel of the neighborhood, a respective significance coefficient ($\left[\frac{1}{\|R_{m,n}\|}\left|x_{i,j}^{old} - \mu_{m,n}\right|^{r}\right]^{1/r}$) (column 5, lines 51-55 of Wong). Said significance coefficient is an element of the summation which is performed in calculating the weighting coefficient ($\nu_{m,n}$) and is a measure of the variation between pixel (i,j) and pixel (m,n) (column 5, lines 51-55 of Wong).

For successive individual pixels, said method further comprises deriving the reconstructed value of the individual pixel ($x_{m,n}^{new}$) (column 5, lines 36-44 of Wong) as a sum over the pixels of the neighborhood of a product of the preprocessed image value at that neighborhood pixel with the significance coefficient of that neighborhood pixel (column 5, lines 51-60 of Wong).

Regarding claim 17: All of the elements comprising the method of claim 17 comprise the method of claim 14. Therefore, the arguments of claim 14 are incorporated herein. The first image having a first value for each of a plurality of pixels is the halftone image having a binary value for each of a plurality of pixels as argued in the arguments regarding claim 14.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 6-9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wong (US Patent 5,506,699).

Regarding claim 6: Wong discloses that, for each individual pixel, the significance coefficient for each neighborhood pixel (i,j) ($\left[\frac{1}{\|R_{m,n}\|}\left|x_{i,j}^{old}-\mu_{m,n}\right|^{r}\right]^{1/r}$) is an increasing function f(v) of the absolute difference (v) between the halftone value at that

neighborhood pixel ($x_{i,j}^{old}$) and the baseline value for the individual pixel ($\mu_{m,n}$) (column 5, lines 51-55 of Wong). By determining the local variation centered about the sample mean (column 5, lines 51-55 of Wong), the correlation between the neighborhood pixel (i,j) and the individual pixel (m,n) is determined. The significance coefficient $\left[\frac{1}{\|R_{m,n}\|}\left|x_{i,j}^{old} - \mu_{m,n}\right|^r\right]^{1/r}$ is an inherently increasing function. However, said significance coefficient is based on the local variation at the center pixel. The lower the variation, the higher the level of correlation. It would therefore be an obvious modification to specifically calculate the significance coefficient as unity minus the variance in order for said significance coefficient to directly correspond to the correlation between the baseline value of the center pixel and a neighborhood pixel. For example, a 5% variance would correspond to a 95% significance between the center pixel and a neighborhood pixel. Therefore, the significance coefficient $\left[\frac{1}{\|R_{m,n}\|}\left|x_{i,j}^{old} - \mu_{m,n}\right|^r\right]^{1/r}$ can easily and obviously be altered to the form $\left\{1 - \left[\frac{1}{\|R_{m,n}\|}\left|x_{i,j}^{old} - \mu_{m,n}\right|^r\right]^{1/r}\right\}$, which is a function that decreases with the absolute difference between the halftone value at that neighborhood pixel and the baseline value for the individual pixel. The motivation for making said modification would be to have said significance coefficient directly correspond with the correlation between the baseline value of the center pixel and a

neighborhood pixel instead of said significance coefficient corresponding directly to the variance between the baseline value of the center pixel and a neighborhood pixel.

Further regarding claim 7: Wong discloses that f(v) is a non-linear function (column 5, lines 51-55 of Wong). The equation $\left\{1-\left[\frac{1}{\|R_{m,n}\|}\left|x_{i,j}^{old}-\mu_{m,n}\right|^{r}\right]^{1/r}\right\}$ is clearly non-linear.

Further regarding claim 8: Wong discloses that f(v) is a continuous function (column 5, lines 51-55 of Wong). The equation $\left\{1-\left[\frac{1}{\|R_{m,n}\|}\left|x_{i,j}^{old}-\mu_{m,n}\right|^{r}\right]^{1/r}\right\}$ is clearly a continuous function.

Further regarding claim 9: The significance coefficient given by the equation $\left\{1-\left[\frac{1}{\|R_{m,n}\|}\left|x_{i,j}^{old}-\mu_{m,n}\right|^{r}\right]^{1/r}\right\}$ can be rewritten algebraically as $\left\{1-\frac{1}{\|R_{m,n}\|^{1/r}}\left|x_{i,j}^{old}-\mu_{m,n}\right|\right\}$ which therefore places said significance coefficient in the form of $f(v)=a\left(1-v/b\right)^{k}$ where $a=1.0$, $b=\|R_{m,n}\|^{1/r}$ and $k=1$.

Response to Arguments

7. Applicant's arguments, see page 9, lines 5-13, filed February 23, 2004, with respect to the information disclosure statement have been fully considered and are

persuasive. The objections to the information disclosure statement listed in item 1 of the first office action dated September 8, 2003 have been withdrawn.

8. Applicant's arguments, see page 9, line 15 to page 11, line 16, filed February 23, 2004, have been fully considered but they are not persuasive. *Applicant argues* that a "written 'program code' (i.e. computer language) in the specification is not required to meet the enablement requirement." *Examiner responds* that, for claims 1 and 22 to be enabling, a clearly defined high-level algorithm is needed. Examiner is not attempting to require a precise listing of the program code in computer language. In fact, Examiner states in item 2 of the first office action (dated September 8, 2003) that "the algorithm(s) and program code(s) for calculating said weighted sum and said significance coefficient are not adequately described in the specification so that one skilled in the art can formulate and implement said algorithm(s) and program code(s). Furthermore, the best mode of implementing said algorithm(s) and program code(s) is not adequately specified." Applicant discloses the weighted sum equation as stated on page 10, line 6 of Applicant's arguments, but Applicant fails to disclose how to properly make and/or use the equations in a tangible form such that one of ordinary skill in the art can make and/or use said equations without undue experimentation.

Furthermore, the specification does not detail the specific steps of the algorithm of Applicant's invention. In the specification, Applicant describes that the baseline value $w^m(i,j)$, which is essential to determining the significance coefficients (page 7, lines 16-20 of specification), "may be y^m itself, but more preferably it is a function of $y^n(i,j)$ for any

n less than or equal to m, in which the high frequency components are reduced, e.g. y^m subjected to a low pass filter, such as an average over the pixels neighboring (i,j)" (page 7, lines 12-14 of specification). Applicant does not set forth the specific steps of the algorithm for calculating the baseline value $w^m(i,j)$, but instead gives several vague possibilities. According to Applicant, $w^m(i,j)$ may be $y^m(i,j)$ or $y^n(i,j)$, $w^m(i,j)$ may be subject to an unspecified low pass filter or to an averaging over the pixels neighboring (i,j). Furthermore, the specific method of defining a neighborhood for pixel (i,j) is not adequately described. One of ordinary skill in the art would assume that a "neighborhood of pixels" means all pixels that are a distance of about 1 to 3 pixels from the center pixel. Applicant does not describe whether the neighborhood of pixels is defined in this way or in some other way, or discloses specific steps with which one of ordinary skill can determine a neighborhood of pixels without undue experimentation. Applicant further describes four possible functions to use in determining the significance coefficient (page 13, lines 3-10 of specification), but does not disclose specifically which equation is used in obtaining the results listed in the tables that follow, specifically tables 5-7 on pages 13-16.

9. Applicant's arguments, see page 11, line 17 to page 12, line 22, filed February 23, 2004, have been fully considered but they are not persuasive. *Applicant argues* that "the disclosure of a written 'program code' in the specification is not required to satisfy the 'best mode' requirement." *Examiner responds* that a precise listing of the program code is not being requested in order to satisfy the best mode requirement. Examiner

contends that a lack of a higher-level algorithm which adequately discloses how the equations are to be implemented in an apparatus, a method, and/or some physically embodied of software is required so that one of ordinary skill can make and/or use the invention in the best mode. It is not the Examiner's contention that the inventor knows of a better mode that is not disclosed. The Examiner contends that the best mode is not *adequately* disclosed.

10. Applicant's arguments, see page 12, line 23 to page 13, line 7, filed February 23, 2004, have been fully considered but they are not persuasive. In the specification, it is not readily apparent that "significance coefficients" refers to the variables $a_{ij}^{m+1}(k,l)$.

11. Applicant's arguments, see page 13, lines 8-13, filed February 23, 2004, with respect to the rejection of claim 7 under 35 USC 112, first paragraph have been fully considered and are persuasive. The rejection under 35 USC 112, first paragraph of claim 7 has been withdrawn.

12. Examiner notes that claim 10 has been cancelled, as stated in Applicant's arguments, see page 13, line 14, filed February 23, 2004.

13. Applicant's arguments, see page 13, line 15 to page 14, line 6, filed February 23, 2004, with respect to the rejections of claims 11 and 12 under 35 USC 112, first

paragraph have been fully considered and are persuasive. The rejections under 35 USC 112, first paragraph of claims 11 and 12 have been withdrawn.

14. Applicant's arguments, see page 14, lines 7-11, filed February 23, 2004, with respect to the rejection of claim 22 under 35 USC 112, first paragraph have been fully considered and are persuasive. The rejection under 35 USC 112, first paragraph of claim 22 has been withdrawn.

15. Applicant's arguments, see page 14, lines 12-15, filed February 23, 2004, with respect to the rejections of claims 2, 13 and 14 under 35 USC 112, second paragraph have been fully considered and are persuasive. Examiner notes that the amended claims traverse the rejections under 35 USC 112, second paragraph. The rejections under 35 USC 112, second paragraph of claims 2, 13 and 14 are therefore withdrawn.

16. Applicant's arguments, see page 14, line 17 to page 18, line 6, with respect to claims 1-8 and 12-22 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A Thompson whose telephone number is 703-305-6329. The examiner can normally be reached on 8:30AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K Moore can be reached on 703-308-7452. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Examiner
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May 5, 2004

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